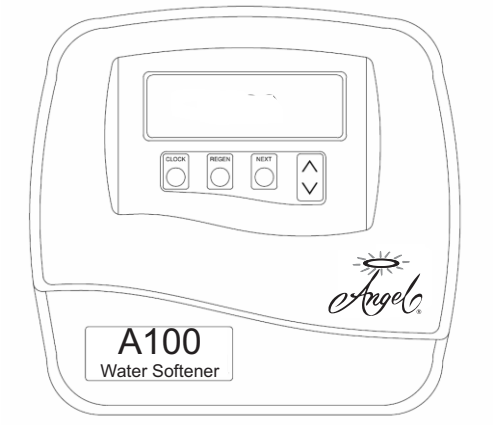
WATER CONDITIONING, INC.

A100 Water Softener Series



Owner's Manual

Angel Water Inc.
Barrington Illinois
(847) 382-7800
www.angelwaterinc.com

SOFT WATER BASICS

Hardness

Excess amounts of calcium and magnesium in water produce hardness. A water softener removes the majority of calcium and magnesium to produce softened water.

Hardness is measured in terms of grains. (This grain weight is derived from the average weight of a dry grain of wheat.) When your water is tested the grain hardness is calculated and expressed as grains per gallon (gpg). This calculation, as well as the number of people in your household will help determine what type and size of water softener will most efficiently soften your water.

Your water softener contains an ion exchange media (sometimes called resin) which removes the hardness from water as it flows through the softener tank. Eventually so much hardness collects on the exchange media that the softener can no longer soften water. At this point it is considered "exhausted". Regeneration is now necessary.

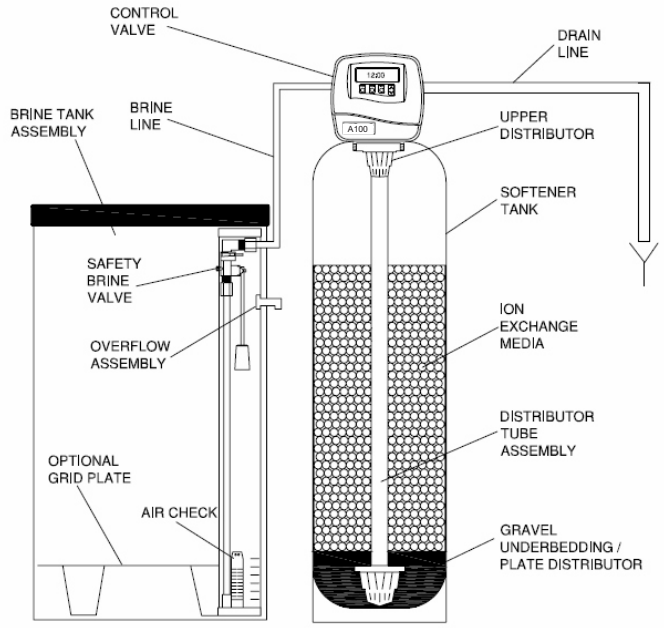


Figure 1

Regeneration

To regenerate the exchange media, it must be rinsed with a brine (salt) solution. This removes the hardness from the exchange media and replaces it with sodium. The exchange media is then ready to remove hardness from water. The hardness minerals and excess brine solution are rinsed down the drain.

During the regeneration cycle the softener is also backwashed. This reversing of the normal flow of water serves to remove sediment which may have accumulated during the softening process due to the filtering action of the exchange media. Backwashing also loosens and fluffs up the bed of exchange media to insure that during regeneration the brine solution will come into contact with all the media.

Maintenance of Your Softener

Salt: Salt to a softener is what gasoline is to a car. Not only must a softener have salt, but it should be the proper type to insure efficient recharging of the unit. Ask your dealer what type of salt may best suit your needs. Always have an adequate supply of salt on hand. Check the salt level of your salt keeper periodically. Fill the tank approximately three-fourths full, with a minimum of 12" of salt.

Cleaning Salt Keeper: Salt keeper may require periodic cleaning. Inspect the salt keeper at least once a year for buildup of insoluble materials. It is recommended to periodically clean the salt keeper no matter what kind of salt you are using. See page 9, miscellaneous #2 for details on cleaning.

REMEMBER: Salt is the fuel to run your water softener. Buy the **best clean salt available.**

FREQUENTLY ASKED QUESTIONS

1. **Do I still use the same amount of soap in the dishwasher and clothes washer and showers now that I have a water softener?** No, the Water Quality Association states soft water can save up to 55% on detergent use. Start with using half the amount of detergent previously used, this can be adjusted up or down based on preference. Soft water helps fabrics last longer, because hardness minerals combined with soap can make fabric fibers brittle.

2. **What is the health impact of drinking soft water?** The sodium added to water by a softening is a non-issue most of the time, even for people on a sodium-restricted diet. One could soften up to 75 grains per gallon water with sodium chloride and still be well within the US Food and Drug Administration's guidelines for a "Low Sodium" beverage. People on a sodium-restricted diet should consult their physician.

3. **Should I use soft water for my plants?** Some plants may be sensitive to even minute amounts of sodium. Suggest using hard water for watering plants, often a kitchen cold faucet is plumbed for hard water or the outside faucets are usually plumbed for hard water. If not, you can place your softener on bypass and fill water containers at the closest sink. Water from a reverse osmosis system can always be used to water plants.

4. **Will water spots disappear now that I have soft water?** Water spots caused by hardness scale will disappear with a functioning water softener. However, other natural minerals dissolved in the water may cause spotting in high enough concentrations. These mineral spots will be much easier to wipe away compared to hardness spotting.

5. **Will soft water cause my water or ice cubes to look or taste different?** Most people can tell the difference in taste between hard and soft water, it is a personal preference. Ice cubes will appear the same, they may look cloudy due to air in water or dissolved minerals, and this will not change because they are made with softened water. A reverse osmosis drinking water system will provide clearer ice cubes.

BYPASS VALVE OPERATION

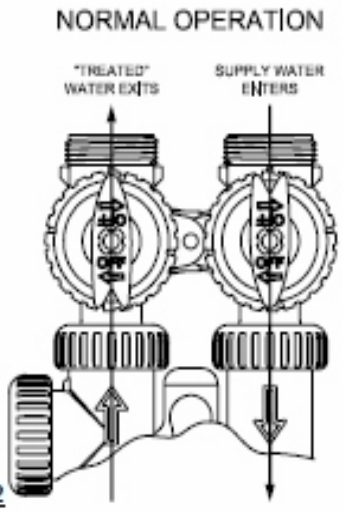


Figure 2

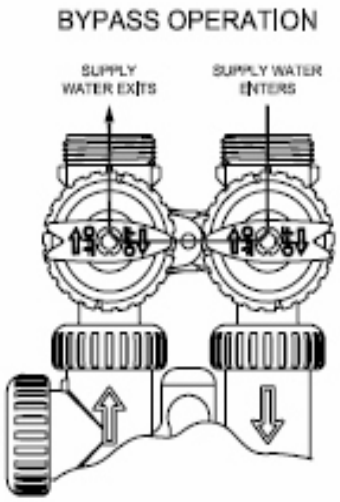


Figure 3

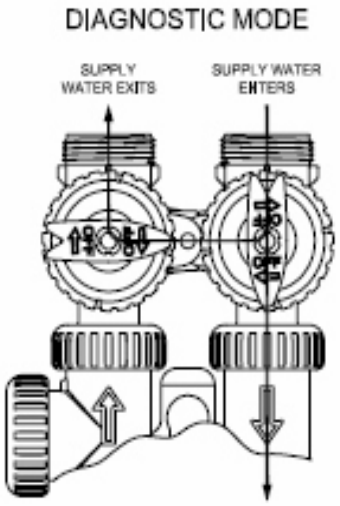


Figure 4

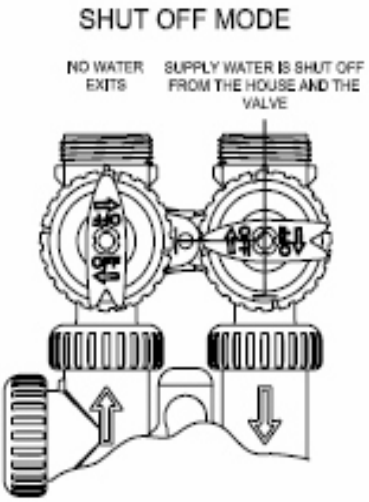


Figure 5

USER DISPLAYS/SETTINGS

General Operation

When the system is operating one of two displays will be shown. Pressing NEXT will alternate between the displays. One of the displays is always the current time of day. The second display is gallons remaining. This is the number of gallons that will be treated before the system goes through a regeneration cycle. The user can scroll between the displays as desired.

If softener is a time clock system, the number of days remaining until the next regeneration will be displayed instead of gallons remaining.

If the system has called for a regeneration that will occur at the preset time of regeneration, the words "REGEN TODAY" will appear on the display.

When water is being treated (i.e. water is flowing through the system) the word "SOFTENING" flashes on the display.

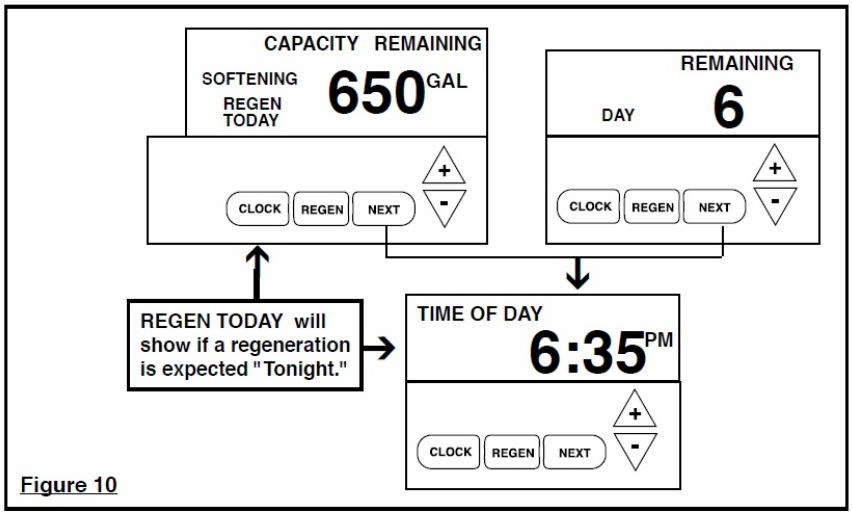
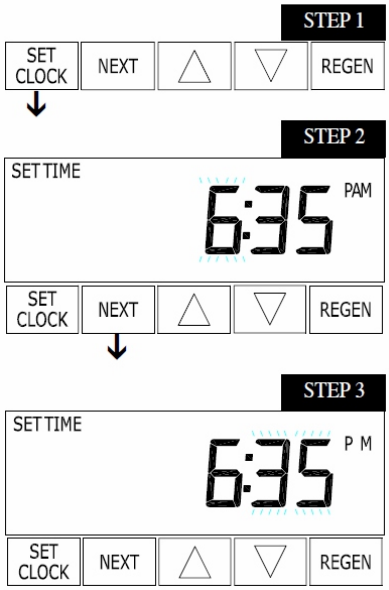


Figure 10



SET TIME OF DAY

Step 1 - Press SET CLOCK.

Step 2 - Current Time (hour): Set the hour of the day using ▲ or ▼ buttons. AM/PM toggles after 12. Press NEXT to go to step 3.

Step 3 - Current Time (minutes): Set the minutes of day using ▲ or ▼ buttons. Press NEXT to exit Set Clock. Press REGEN to return to previous step.

Power Loss - Lithium battery on circuit board provides up to 8 hours of time clock backup during power outages. After 8 hours, only the time of day needs to be reset, all other values are stored in non-volatile memory. If a power loss last less than 8 hours and time of day is flashing, replace coin type 2032 battery. Do not forget to reset for daylight savings time.

Regeneration Mode

Typically a system is set to regenerate at a time of low water usage. An example of a time with low water usage is when the household is asleep. If there is a demand for water when the system is regenerating, untreated water will be supplied.

When the system begins to regenerate, the display will change to include information about the step of the regeneration process and the time remaining for that step to be completed. The system runs through the steps automatically and will reset itself to provide treated water when the regeneration has been completed.

Regeneration Step #2
(shows time remaining in regen step is 8:22)

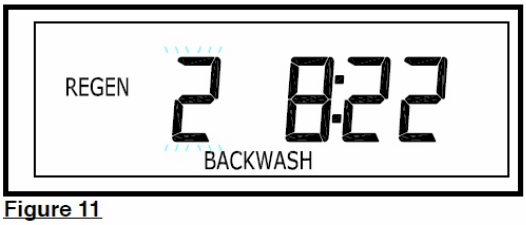


Figure 11

Manual Regeneration

Sometimes there is a need to regenerate the system, sooner than when the system calls for it, usually referred to as manual regeneration. There may be a period of heavy water usage because of guests or a heavy laundry day.

To initiate a manual regeneration at the preset delayed regeneration time, press and release "REGEN". The words "REGEN TODAY" will flash on the display to indicate that the system will regenerate at the preset delayed regeneration time. If you pressed the "REGEN" button in error, pressing the button again will cancel the request.

To initiate a manual regeneration immediately, press and hold the "REGEN" button for three seconds. The system will begin to regenerate immediately. The request cannot be cancelled. You must cycle all the way through the cycles to make it stop. PLEASE NOTE: This will reset the meter.

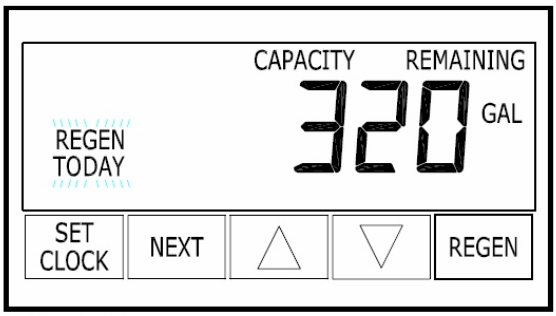


Figure 12

If back-to-back regenerations are desired, press and release "REGEN" button. "REGEN TODAY" will appear on screen. Push and hold REGEN button to initiate immediate regeneration. The softener will regenerate again at specified time. Back-to-back regenerations are recommended when salt is allowed to run out in brine tank.

Note: If the salt keeper does not contain salt, fill with salt and wait at least two hours before regenerating.

TROUBLE SHOOTING

PROBLEM	CAUSE	CORRECTION
1.ERROR followed by code number		
Error Code 1001 - Unable to recognize start of regeneration	A. Control valve has just been serviced	A. Press NEXT and REGEN for 3 seconds or unplug power source jack from PC Board (black wire) and plug back in to reset control valve
Error Code 1002 - Unexpected stall	B. Foreign matter is lodged in control valve	B. Check piston and spacer stack assembly for foreign matter
Error Code 1003 - Motor ran to long, timed out trying to reach next cycle position	C. High drive forces on piston	C. Address high drive forces by Loosening drive cap assembly 1/4 turn
Error Code 1004 - Motor ran to long, timed out trying to reach home position	D1. Control valve piston not in home position	D1. Press NEXT and REGEN for 3 seconds or unplug power source jack (black wire) and plug back in to reset control valve
	D2. Motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure	D2. Check motor and wiring. Replace motor if necessary
	D3. Drive gear label dirty or damaged, missing or broken gear	D3. Replace or clean drive gear
If other Error Codes display contact the factory	D4. Drive bracket incorrectly aligned to back plate	D4. Reset drive bracket
	D5. PC board is damaged or defective	D5. Replace PC board
	D6. PC board incorrectly aligned to drive bracket	D6. Ensure PC board is correctly snapped on to drive bracket
2. Control valve stalled in regeneration	A. Motor not operating	A. Replace Motor
	B. No electric power at outlet	B. Repair outlet our use working outlet
	C. Defective transformer	C. Replace transformer
	D. Defective PC board	D. Replace PC board
	E. Broken drive gear or drive cap assembly	E. Replace drive gear or drive cap assembly
	F. Broken piston retainer	F. Replace drive cap assembly
	G. Broken main or regenerant piston	G. Replace main or regenerant piston
3. Control valve does not regenerate automatically when REGEN button is depressed and held	A. Transformer unplugged	A. Connect transformer
	B. No electric power at outlet	B. Repair outlet or use working outlet
	C. Broken drive gear or drive cap assembly	C. Replace drive gear or drive cap assembly
	D. Defective PC board	D. Replace PC board
4. Control valve does not regenerate automatically but does when REGEN button is depressed	A. By-pass valve in bypass position	A. Put control valve in service position
	B. Meter connection disconnected	B. Connect meter to PC board
	C. Restricted/stalled meter turbine	C. Remove meter and check for rotation or foreign matter
	D. Defective meter	D. Replace meter
	E. Defective PC board	E. Replace PC board
	F. Set-up error	F. Check control valve set-up procedure
5. Time of day flashes on and off	A. Battery back-up maintains time of day up to 8 hours in event of power outage and battery is not depleted. If time of day is flashing, it indicates battery is depleted.	A. Reset time of day and replace battery on PC Board (Lithium coin type battery 2032)
	B. Prior to 2/2007 PC Board did not have battery back-up - capacitor held time of day up to 2 hours.	B. Reset time of day.
6. Softener delivers hard water.	A. Bypass valve is open or faulty.	A. Close bypass valve or replace.
	B. No salt or low salt level in brine tank.	B. Add salt to brine tank and maintain salt level above water level.
	C. Softener fails to draw brine.	C. See problem #11.
	D. Excessive water usage.	D. Check gallon capacity settings.
	E. Insufficient brine level in brine tank.	E. Check brine refill setting and refill flow restrictor for blockage.
	F. Resin level inadequate.	F. See problem #8.
	G. Meter faulty.	G. Test meter and clean or replace meter.
	H. Raw water hardness fluctuation.	H. Test raw water hardness and adjust settings to highest known hardness.
7. Unit uses too much salt.	A. Improper brine refill setting.	A. Check brine refill setting for proper salt dosage
	B. Improper settings.	B. Check water hardness and reevaluate capacity setting specification
	C. Excessive water in brine tank.	C. See problem #10.
	D. Leaking faucets, toilets, etc...	D. Repair or replace those items.

TROUBLE SHOOTING

PROBLEM	CAUSE	CORRECTION
8. Loss of resin.	A. Backwash controller missing. B. Faulty distributor tube assembly. C. Air in water supply system.	A. Install backwash controller. B. Check distributor tube assembly for cracks or holes. C. 1. Check for leaks in brine lines, fittings, or air check. Repair or replace. 2. Install upper distributor. 3. Ensure that water supply system has an air eliminator.
9. Softener delivers salt water.	A. Low water pressure. B. Excessive water in brine tank. C. Wrong size injector.	A. Check incoming water pressure - Must remain at minimum of 25 psi. B. See problem #10. C. Install correct injector.
10. Excessive water in brine tank.	A. Plugged injector. B. Faulty piston assembly. C. Plugged or kinked drain line. D. Backwash flow controller closed off. E. Defective brine line flow control.	A. Remove injector and clean ports. B. Replace piston assembly. C. Inspect drain line for kinks or plugging. D. Check backwash flow controller. E. Replace brine refill flow control.
11. Softener fails to draw brine.	A. Injector is plugged. B. Faulty piston assembly. C. Brine line connection leak. D. Drain line plugged creating excess back pressure. E. Drain line too long or too high F. Low inlet pressure.	A. Remove injector and clean ports. B. Check piston assembly. C. Inspect brine line during refill cycle for leaks. D. Inspect drain line for blockage. E. Refer to drain line specifications. F. Increase inlet pressure to a minimum of 25 psi.
12. Continuous flow to drain.	A. Piston assembly failure. B. Motor failure. C. Circuit board failure.	A. Replace piston assembly. B. Replace motor. C. Replace circuit board.
13. Loss of water pressure.	A. Iron build-up in resin. B. Resin bed fouled with sand or sediment. C. Resin bed mushing due to high amount of oxidizers in water supply (chlorine).	A. See problem #14. B. Rebed softener and install sediment filter ahead of softener. C. Rebed softener. Install dechlorinaton system
14. Iron in softened water.	A. Iron has fouled resin bed. B. Iron is not in a soluble state. C. Prefilter failure. D. Iron level excessive. E. Control fails to regenerate.	A. Use iron reducing resin cleaner to cleanse resin bed, and increase salt dosage or regenerate more frequently. Install an Iron Curtain System ahead of the softener. B. Test water to determine type of iron, install iron reduction system. C. Check prefilter. D. Install iron reduction system. E. See problem #4.
15. Absent or incomplete LED display	A. Transformer unplugged B. No electric power at outlet C. Defective transformer D. Short in meter E. Defective PC board	A. Plug transformer into uninterrupted outlet B. Repair outlet or use working outlet C. Replace transformer D. Unplug meter from PC board, if LED display lights appropriately, replace meter E. Replace PC board
16. Control does not display correct time of day	A. Power outage > 8 hours B. Power outage < 8 hours, time of day flashing, battery depleted	A. Reset time of day B. Replace lithium coin type battery on circuit board Model 2032 battery
17. No "softening" or "filtering" display when water is flowing	A. Bypass valve in bypass position B. Meter connection disconnected C. Restricted/stalled meter turbine D. Defective meter E. Defective PC board	A. Put bypass valve in service position B. Connect meter to PC board C. Remove meter and check for rotation, clean foreign material D. Replace meter E. Replace PC board
18. Control valve regenerates at wrong time of day	A. Power outages > 8 hours B. Time of day not set correctly C. Time of regeneration incorrect D. Control valve set at "on 0" (immediate regeneration) E. Control valve set at NORMAL + on 0	A. Reset control valve to correct time of day, replace battery if time of day flashing B. Reset to correct time of day C. Reset regeneration time D. Check control valve set-up procedure regeneration time option (see table 6, page 19) E. Check control valve set-up procedure regeneration time option (see table 6, page 19)

GENERAL SPECIFICATIONS

OPERATING PRESSURES

Minimum/Maximum .....25 psi-120 psi

OPERATING TEMPERATURES

Minimum/Maximum .....40° - 110° F

METER

Accuracy .....±5%

Flow Rate Range.....0.25 - 27 GPM

Gallon Range .....20 - 50,000

DIMENSIONS

Drain Line .....3/4" or 1" NPT

Brine Line .....3/8" Poly Tube

Electrical Current Draw and Voltage 0.5A 110v

Compatible with the following regenerants or chemicals: Sodium chloride, potassium permanganate, sodium bisulfate, sodium hydroxide, hydroxide, hydrochloric acid, chlorine and chloramines.

A100 SERIES Water Softeners Limited Warranty

Angel Water, Inc., warrants to the original consumer purchaser that the A100 Series and the parts listed below will be free from defects in material and/or workmanship from the date of the original installation for the following time periods:

Angel Water Conditioning Inc. will repair or replace without cost for a period of one year after purchase, any part or portion, which our examination shall disclose to be defective. At the expiration of this service policy, a service fee will be charged.

- Angel warranties to the original owner all parts* related to equipment for a period of 5 years. In addition, for a period of 5 – 10 years, Angel warranties all parts subject to a $45.00 deductible.

A charge will be made for service required because of misuse, alteration, freezing, neglect, used in rental property, accident, foreign matter, change in water content, customer error, customer imagination, or other causes beyond Angel's control.

"Manufacturing Defect" does not include damage to the unit or its parts caused by abuse, negligence, freezing, fire, heat, direct exposure to weather or sunlight, water pressures exceeding 100 psi, flooding, other causes not considered normal operating conditions, or an act of God.

*Wearable parts not covered by this warranty include screens, injectors, valve disks which are wearable and may be damaged by water itself.

Owners Obligation

The unit must be installed and operated within the design limitations according to the installation and maintenance manual provided.

This warranty is valid to the original owner when installed by an Angel representative only. (Warranty transfers may be purchased)

Customer must properly maintain the unit per the manufactures service schedule.

- Water Softener - Must properly provide salt for the unit regularly and set timer to correct time of day. Must have Angel Water Conditioning perform an annual (every year) inspection, service and cleaning of unit.